

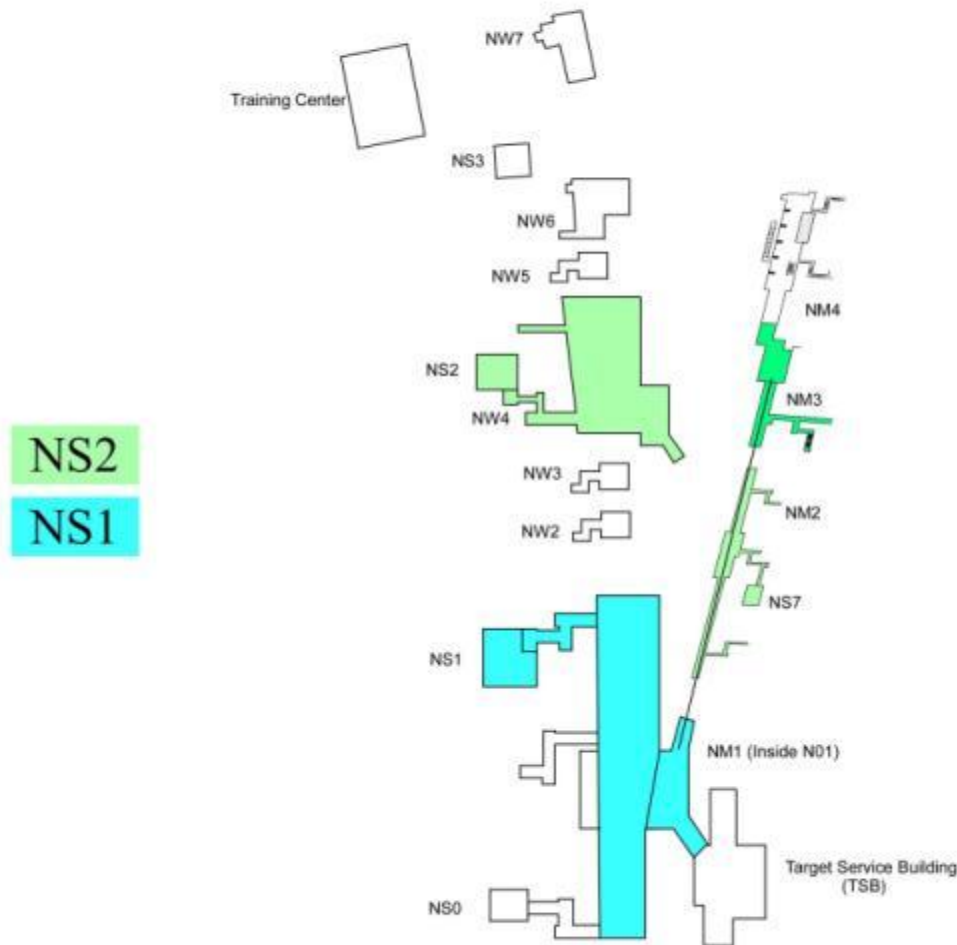
Turning on the NS2LCW System,
and filling the expansion tank
when needed.

In the Neutrino beam line we have 2 LCW systems located at NS1 & NS2 and 1 RAW system located at the SeaQuest Service Building.



Fermilab - Neutrino Area LCW

This map shows what areas, Service Buildings and enclosures, the 2 LCW systems cover.



NS2 LCW System

The NS2 LCW system supplies cooling water for the Power Supplies in NS7, and for the magnets in NM2, NM3 and NM4.

The LCW system consists of 3 pumps, normally we use 2, and they are located in the LCW room on the north side of the NS2 Service Building.

PA 553 DIGITAL STATUS

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S53    DIGITAL STATUS                                ♦Pgm_Tools♦  AGG CONTRL
PARAM* *SA♦ X-A/D  X=TIME      Y=E:VCAP4 ,E:THCURR,A LQ      ,D QD  *RESET
*save  ----- Eng-U  I= 0      I= 0      , 0      , 0      , 0      *ON
      Once AUTO  F= 120      F= 10      , 2      , 1400      , 300    *OFF
.global .linac... .booster ...mi... ..tev... ..sy... .p-bar... .misc... collider

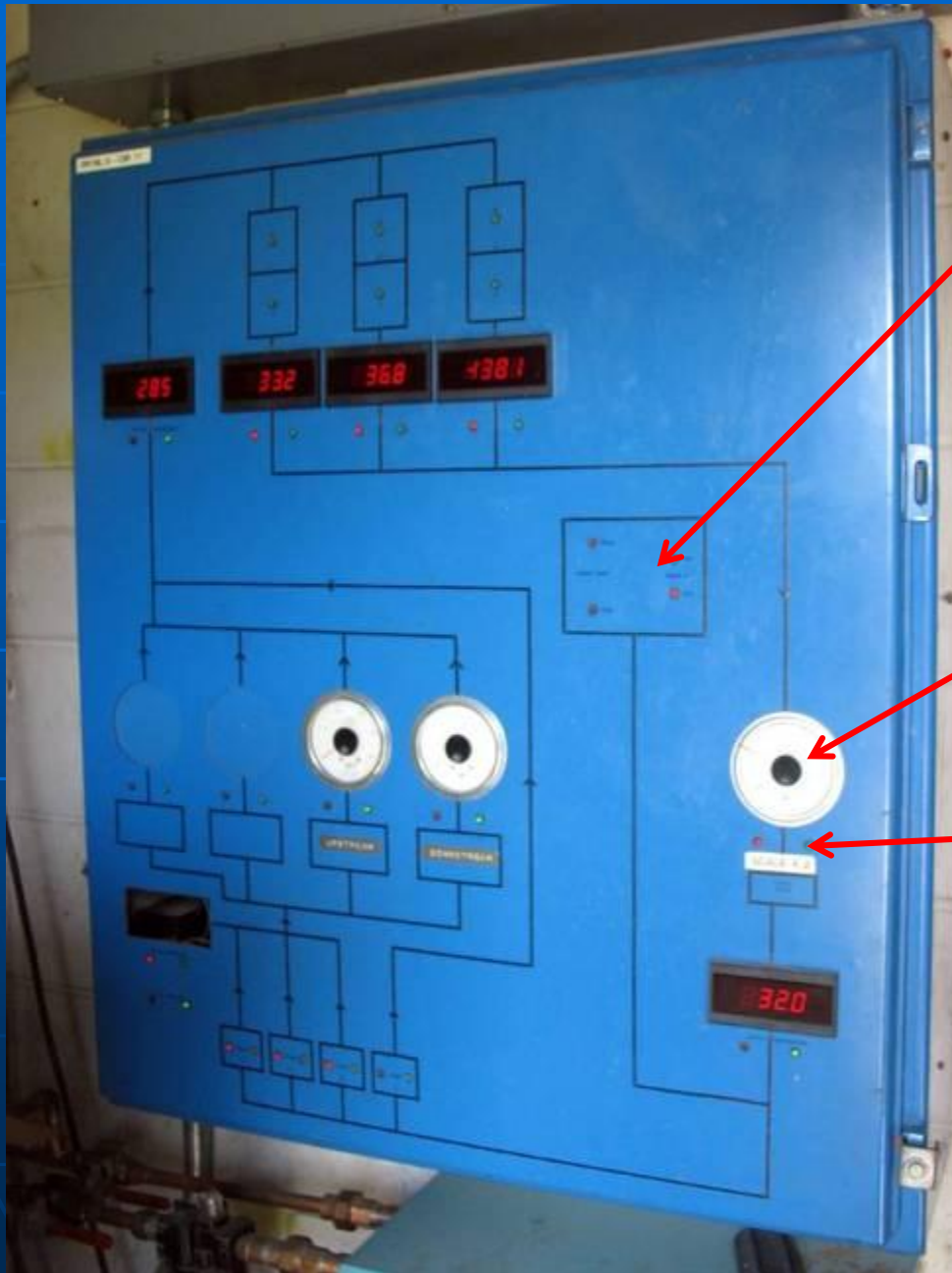
F:NS2LCW      NS2LCW status/flow                      ♦See Alarm Log♦
♦More Info♦
*** See HELP ***

System Sum (ignore)      ALARM  0 bit-31 .....
bit-10 .....            1 bit-30 .....
Return Temperature      ALARM  0 bit-29 .....
Supply Temperature      OKAY   0 bit-28 .....
System Pressure         ALARM  0 bit-27 .....
Air Pressure            OKAY   0 bit-26 .....
Total System Flow       ALARM  0 bit-25 .....
Make-up                 OKAY   1 bit-24 .....
Surge Tank hi level     OKAY   1 bit-23 .....
Pump #3                 OFF    0 bit-22 .....
Pump #2                 OFF    1 bit-21 .....
Pump #1                 OFF    0 bit-20 .....

```

Here we see that pumps #2 and #3 are off.

The Blue Box controller



Make-up indicator

Flow meter shows the rate of the water flowing through the pipes.

The System LEDs show that the system is on.

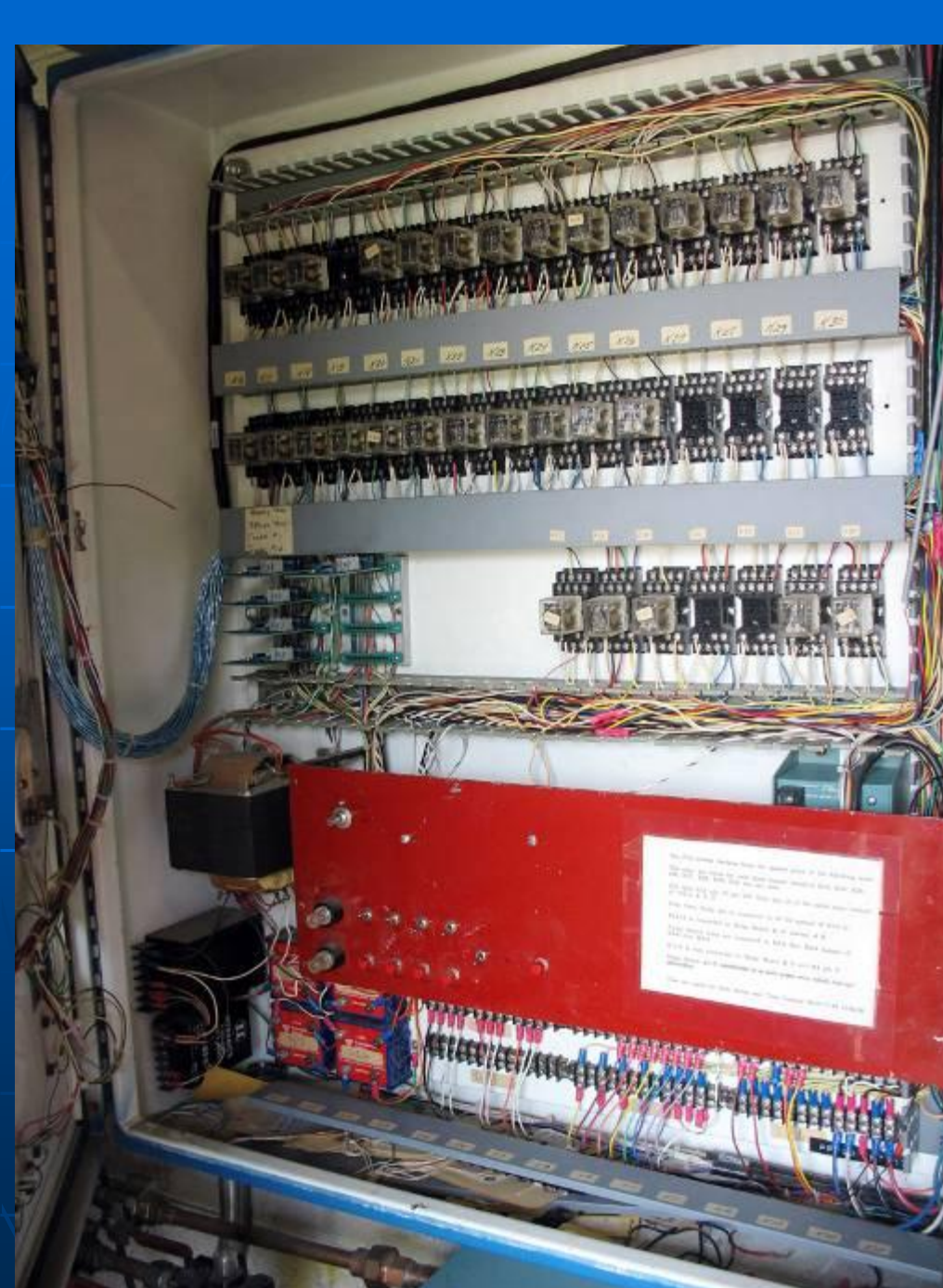


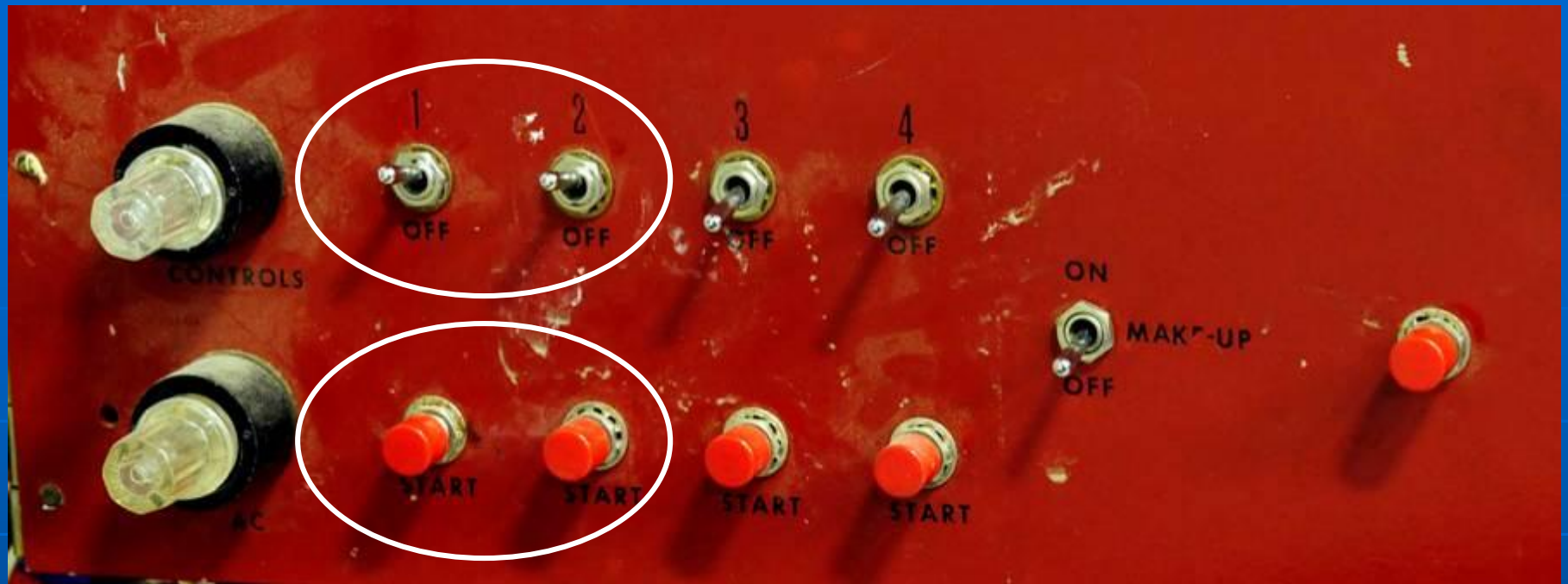
Here we see the flow meter at 0

and the red LED is lit, no flow.

Let's open the blue door and see what's inside.

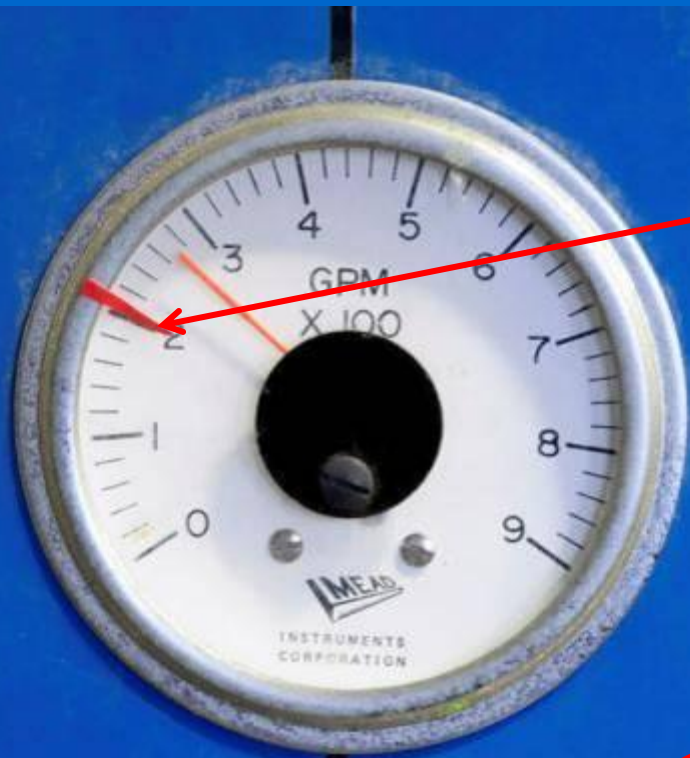
We are mostly concerned with the red panel. The panel has 4 toggle switches for the 3 pumps and below each toggle switch is a black button used to turn on the pump. In addition, to the right is a switch to turn on the makeup for the expansion tank.





Here we see that pumps number 1 & 2 are being used, the toggle switches are on. To turn the NS2 LCW System on, press both start buttons for pumps 1 & 2 and watch the Flow gauge on the front panel.

Note: The Water Werks group may change which pumps they are using, so DO NOT change the pump switches. Questions contact the Water Group.



When the system is up and running, the flow meter will show flow, GPM, above the red line and the green LED will be lit.

SCALE X 2

TOTAL
FLOW

PA S53 DIGITAL STATUS

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S53    DIGITAL STATUS                                ♦Pgm_Tools♦  AGG CONTRL
PARAM* *SA♦ X-A/D  X=TIME      Y=I:LAM52 ,I:LAM52F,I:HV703 ,I:HV703F *RESET
*save  BL-- Eng-U  I= 0        I= 0      , 0      , 0      , 0      *ON
       s_MI AUTO  F= 7        F= 2200   , 2200   , 5000   , 5000   *OFF
.global .linac.. .booster ...mi... ..tev... ..sy... .p-bar.. .misc... collider

F:NS2LCW    NS2LCW status/flow                      ♦See Alarm Log♦
♦More Info♦                                           ♦Ctrl-Menu♦
*** See HELP ***                                     0 bit-31 .....< 5
                                                    0 bit-30 .....
                                                    0 bit-29 .....-
                                                    0 bit-28 .....< 3
                                                    0 bit-27 .....
                                                    0 bit-26 Local  5
                                                    0 bit-25 Alarm is
                                                    0 bit-24 ACTIVE-OK
                                                    0 bit-23 Speech is
                                                    0 bit-22 BYPASSED
                                                    0 bit-21 Edit
                                                    0 bit-20
                                                    0 bit-19 < not critical call tech
                                                    0 bit-18
                                                    0 bit-17
                                                    0 bit-16

System Sum (ignore)      OKAY      1 bit-15
bit-10 .....            1 bit-14
Return Temperature      OKAY      1 bit-13
Supply Temperature      OKAY      1 bit-12
System Pressure         OKAY      1 bit-11
Air Pressure            OKAY      1 bit-10
Total System Flow       OKAY      1 bit-9
Make-up                 OKAY      1 bit-8
Surge Tank hi level     OKAY      1 bit-7
Pump #3                 OFF       0 bit-6
Pump #2                 ON        1 bit-5
Pump #1                 ON        1 bit-4

```

Messages

Pumps #2 and #3
are now on.

We occasionally will need to fill the expansion tank when it gets low. If the expansion tank needs filling we most likely have gotten an ACNET alarm. At the chassis, or blue box, the Make-up LED will be lit.



PA 553 DIGITAL STATUS

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S53      DIGITAL STATUS                                ♦Pgm_Tools♦  AGG CONTRL
PARAM*   *SA♦ X-A/D  X=TIME*30  Y=S:VT210 ,S:HT210 ,S:HT210F,S:VT210F  *RESET
*save    BL-- Eng-U  I= 0       I= 79.75 , 35.75 , 35.75 , 79          *ON
          s_MI AUTO  F= 6       F= 80.25 , 36.25 , 36.25 , 81          *OFF
.global. .linac... .booster ...mi... ..tev... ..sy... .p-bar... .misc... collider

F:NS2LCW  NS2LCW status/flow                                ♦See Alarm Log♦
♦More Info♦
*** See HELP ***

System Sum (ignore)      ALARM
bit-10 .....
Return Temperature       ALARM
Supply Temperature       OKAY
System Pressure          OKAY
Air Pressure             OKAY
Total System Flow        OKAY
Make-up                  ALARM
Surge Tank hi level      OKAY
Pump #3                  ON
Pump #2                  ON
Pump #1                  OFF
  
```

```

0 bit-31 .....
0 bit-30 .....
0 bit-29 .....
0 bit-28 .....
0 bit-27 .....
1 bit-26 .....
0 bit-25 .....
1 bit-24 .....
1 bit-23 .....
1 bit-22 .....
1 bit-21 .....
0 bit-20 .....
1 < not critical call tech
1 bit-18 .....
1 bit-17 .....
0 bit-16 .....
  
```

```

♦Ctrl-Menu♦
0 .....< 5
0 .....
0 .....
0 .....< 3
0 .....
0 Local 5
0 Alarm is
ALARMING
0 Speech is
0 BYPASSED
0 Edit
  
```

Messages

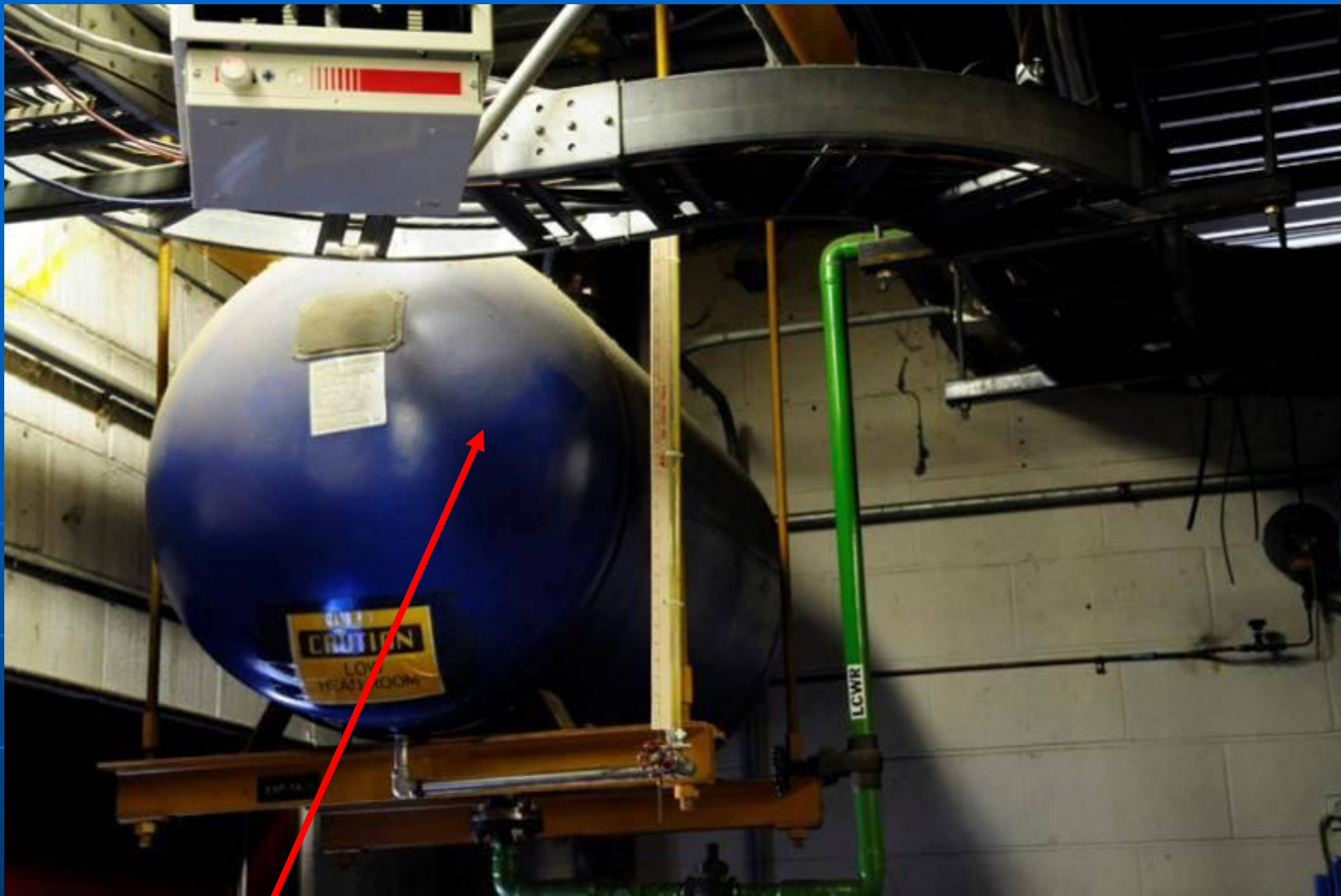
Here we see the system on, but Make-up is in alarm, we need to add water to the expansion tank.

Note: The next few slides will instruct you on how to add water to the NS2LCW System. Currently the NS2LCW System is running with glycol, therefore we are NOT allowed to add water to the system, only the Fluids department techs are allowed to add glycol.

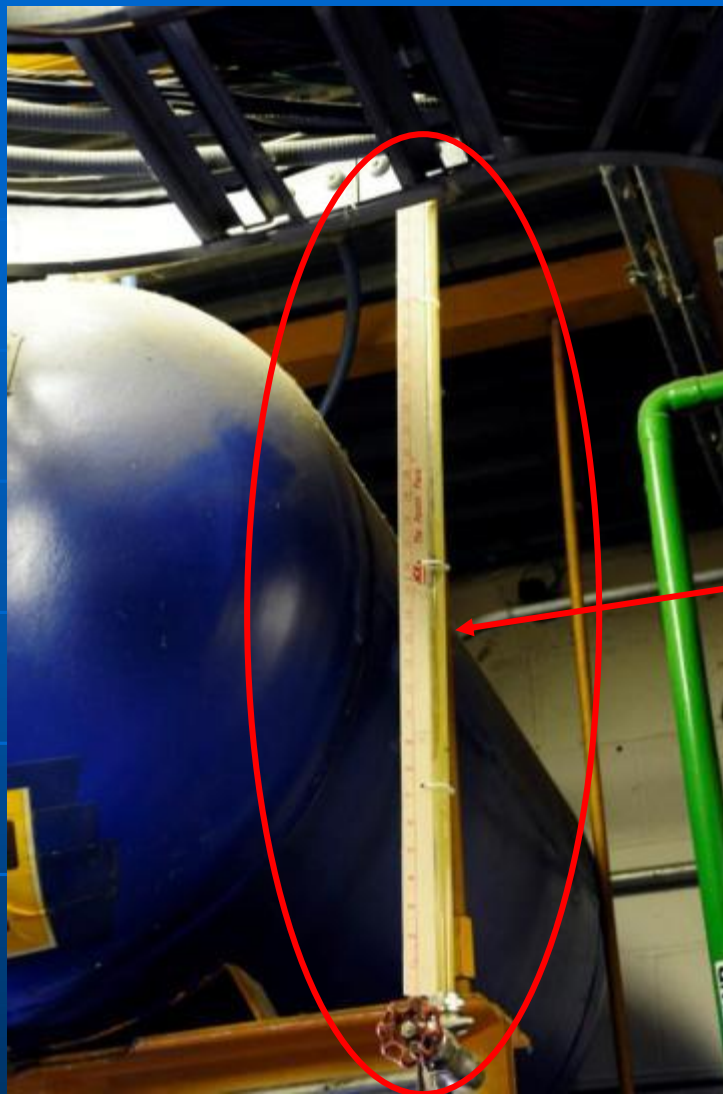
What does it mean to fill the expansion (Surge) Tank?

Every system has an expansion tank to hold water when the volume fluctuates, cold contracts and hot expands, the water has somewhere to go. It also acts as a buffer for leaks. Because of the leaks, small and large, we will occasionally need to add water to the expansion tank. The expansion tank is a large oval (normally) blue tank that is in the LCW room and usually near the ceiling. On one side of the tank there will be a glass tube, about 1/2 inch in diameter and about 36 inches long, with a ruler attached to it to help determine the level of the tank and how much water needs to be added. The Water Works Group attached 3 tie wraps on the glass tube, a low level, a high level, and a mid point. The mid point tie wrap should line up with the Surge Tank Alarm. So when the level falls below the middle tie wrap an alarm will happen on Acnet, saying we need to add water to the expansion tank. We normally fill it up about 6-8 inches, the level will be above the mid point mark.

The next few slide will explain filling the expansion tank for the NS2 LCW system using pictures.



The expansion tank is on the ceiling near the east wall.

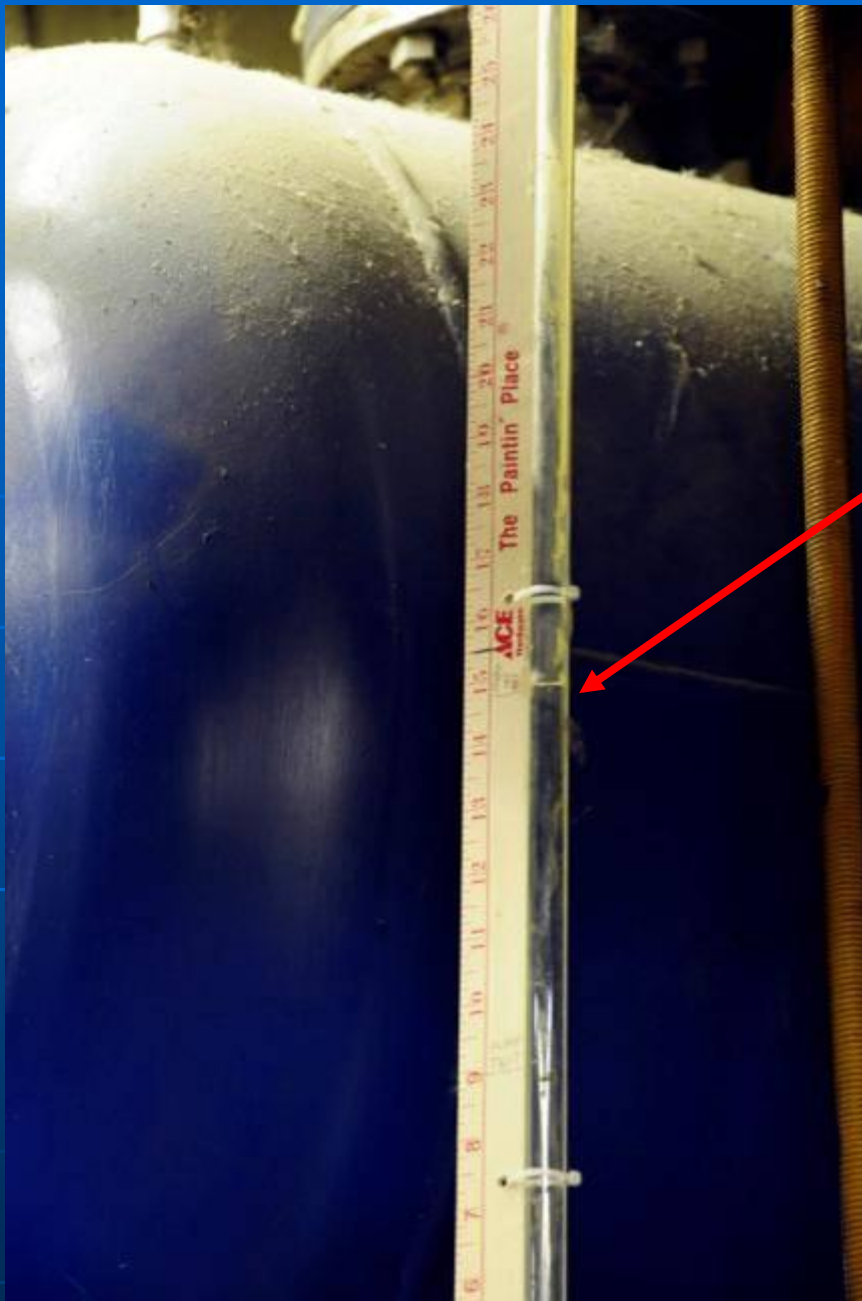


Sight
glass

A closer picture of the expansion tank. See the sight glass for filling the tank on the right side of the tank.



Here are the 3 tie wraps.



Here we see the level below the mid level tie wrap.

Which means you will need to add water to the expansion tank.

To add water to the expansion tank, we will need to open 2 valves, flip a switch in the Blue box and the expansion tank will start filling.

Okay, now let's see if we can find those valves.

Now, where are those 2 valves we need to open? In the NS2 LCW room they are behind the orange block.



Back
here



The small needle valve is hidden behind the orange block, notice there is a tag to help you find it.

Rotate the black valve until it's open all the way.

Tag

The second valve is also behind the Orange block. See the tag, rotate the red handle to open it.

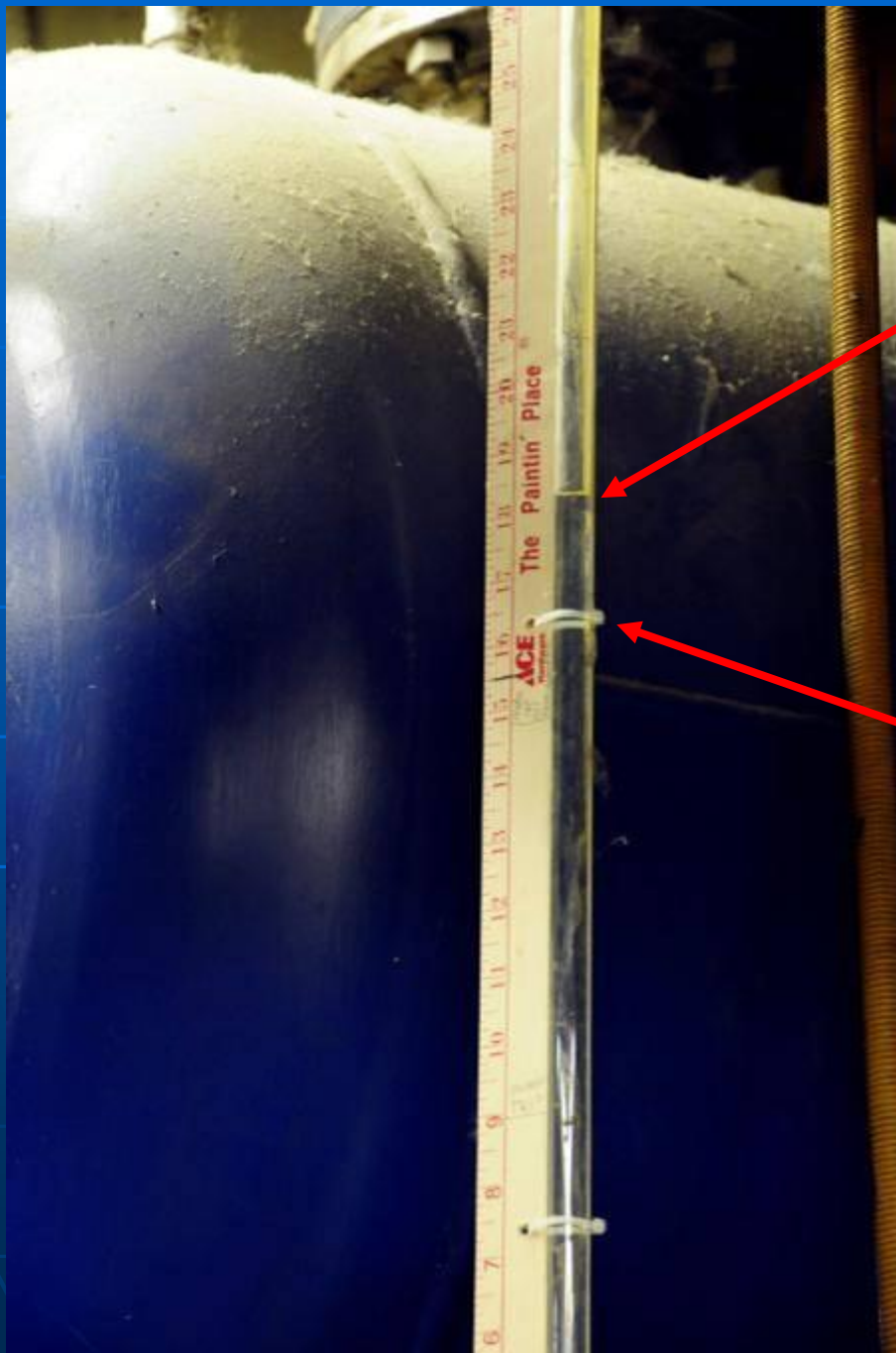
Tag

Back to the expansion tank, after the valves are open, open the door and to the right of the pump switches you will see the Make-up switch, flip it on.





While you are filling the Expansion tank, keep an eye on the sight glass checking the level. Once the sight glass shows the proper level stop.

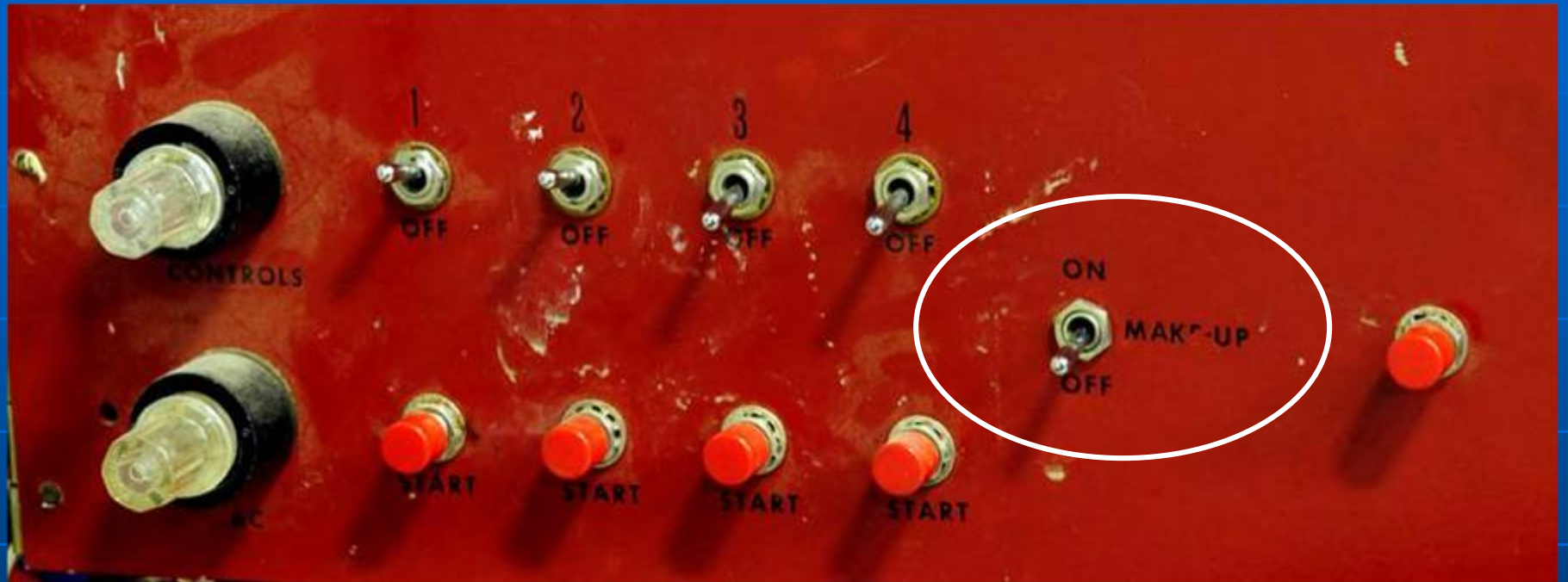


Here we see the level is above the mid level. When filling watch the Make-up panel for the Off LED to turn green.

Mid point tie wrap.

The Make-up LED should now be off.





So now flip the Make-up switch to Off.



The small needle valve needs to be closed

The second valve is also needs to be closed, and now you are finished.

PA S53 DIGITAL STATUS

S53 DIGITAL STATUS ♦Pgm_Tools♦ AGG CONTRL
 PARAM* *SA♦ X-A/D X=TIME Y=I:LAM52 ,I:LAM52F,I:HV703 ,I:HV703F *RESET
 *save BL-- Eng-U I= 0 I= 0 0 0 0 *ON
 s_MI AUTO F= 7 F= 2200 , 2200 , 5000 , 5000 *OFF
 .global. .linac.. .booster ...mi... ..tev.. ...sy... .p-bar.. .misc... collider

F:NS2LCW NS2LCW status/flow

♦More Info♦

*** See HELP ***

♦See Alarm Log♦

♦Ctrl-Menu♦

System Sum (ignore)	OKAY	0 bit-31	0< 5
bit-10		0 bit-30	0
Return Temperature	OKAY	0 bit-29	0 -
Supply Temperature	OKAY	0 bit-28	0< 3
System Pressure	OKAY	1 bit-27	0
Air Pressure	OKAY	1 bit-26	0 Local 5
Total System Flow	OKAY	1 bit-25	0 Alarm is
Make-up	OKAY	1 bit-24	0 ACTIVE-OK
Surge Tank hi level	OKAY	1 bit-23	0 Speech is
Pump #3	OFF	1 bit-22	0 BYPASSED
Pump #2	ON	1 bit-21	0 Edit
Pump #1	ON	1 bit-20	0
		1 < not critical call tech	0
		0 bit-18	0
		1 bit-17	0
		1 bit-16	0

Messages

The system is on, Pumps #2 & #3 are running, and Make-up is okay.

da End, stay cool